JET PROPULSION LABORATORY INTEROFFICE MEMORANDUM

March 14, 2005

TO: G. Burke

FROM: N. Satterlee

SUBJECT: Special Request by the Hayabusa (MUSC) Project for Increased Supports from September 2005 through December 2005

The Resource Allocation Planning and Scheduling Office (RAPSO) has completed a special study to analyze the ability of the DSN to provide the Hayabusa (MUSC) Project with increased tracking supports from September 2005 through December 2005.

Background

The Hayabusa (MUSC) Project is inquiring on the feasibility of increased supports for a 12-week period during Weeks 37 - 48, 2005. Increased supports during this critical phase of the mission will enable the project to obtain coherent ranging, in addition to added telemetry and commanding. This study focuses on determining the DSN's ability to accommodate increased supports during this time period on the 34BWG1 and 34BWG2 subnets.

Methodology

Analysis was accomplished using the updated mission set database from the February 2005 Resource Allocation Review Board (RARB) and Forecasting and Scheduling Tools for Earth-based Resources (FASTER).

Utilizing FASTER, RAPSO analyzed current network loading on the 34M Beam Wave Guide-1 (BWG1) and 34M Beam Wave Guide-2 (BWG2) subnets, in Weeks 37 – 48, 2005. TIGRAS software development provided RAPSO with merged Hayabusa (MUSC) and Usuda view period files, enabling an accurate determination of available support times for the interval analyzed. As Mid-Range Resource Allocation schedules are not yet available for Weeks 39 – 40, the request for proposed additional supports submitted to RAPSO by the Hayabusa (MUSC) project representative (see Figure 2), was converted into a forecast User Loading Profile (ULP) for analysis purposes.

Summary

A review of mission supports currently scheduled in Weeks 37 – 38, 2005 and an approximation of future schedules based on current User Loading Profiles (ULP) for all active missions was conducted. RAPSO's findings confirm that the DSN would be able to accommodate an increase in supports for the Hayabusa (MUSC) during this time period.

Assumptions

- DSS – 15 down for USC installation and Antenna Controller Replacement in Weeks 37 – 48 of 2005. USC installation and Antenna Controller Replacement to be done NIB in Weeks 37 and 38 of 2005.
- DSS – 55 down for USC installation in Weeks 37 – 38 of 2005
- DSS – 54 down for USC installation in Weeks 39 – 40 of 2005
- Subnets utilized to meet Hayabusa (MUSC) mission requirements remain unchanged, 34BW1 and 34BWG2

Current Key Mission Requirements

- 80% of CLUSTER II's Wide-Band Data (WBD) Opportunities are in the southern hemisphere and require simultaneous tracking support from three to four apertures

- SOHO will be in their Keyhole period in Weeks 42 through 44 of 2005 (Mini Keyhole)

Other major events and downtimes occurring during the study period are listed in the supporting data attached at the end of this study.

Analysis

During the period studied, the increased requirements caused a difference of +/-1% change to Hayabusa (MUSC) supportable time. Overall supportability for all users of the BWG subnets was unaffected by the proposed Hayabusa (MUSC) project requirements increase, due to the scheduling of supports at Goldstone and Madrid complexes.

Conclusion

Based on current Mid-Range Resource Allocation schedules built through Week 38/2005 and an approximation of future schedules, which will be built according to current User Loading Profiles (ULPs) for all active missions; DSN would be able to accommodate the proposed increase in supports for the Hayabusa (MUSC) project during this time period.

cc:
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Figure 1 –Major DSN Events and Downtimes 2005

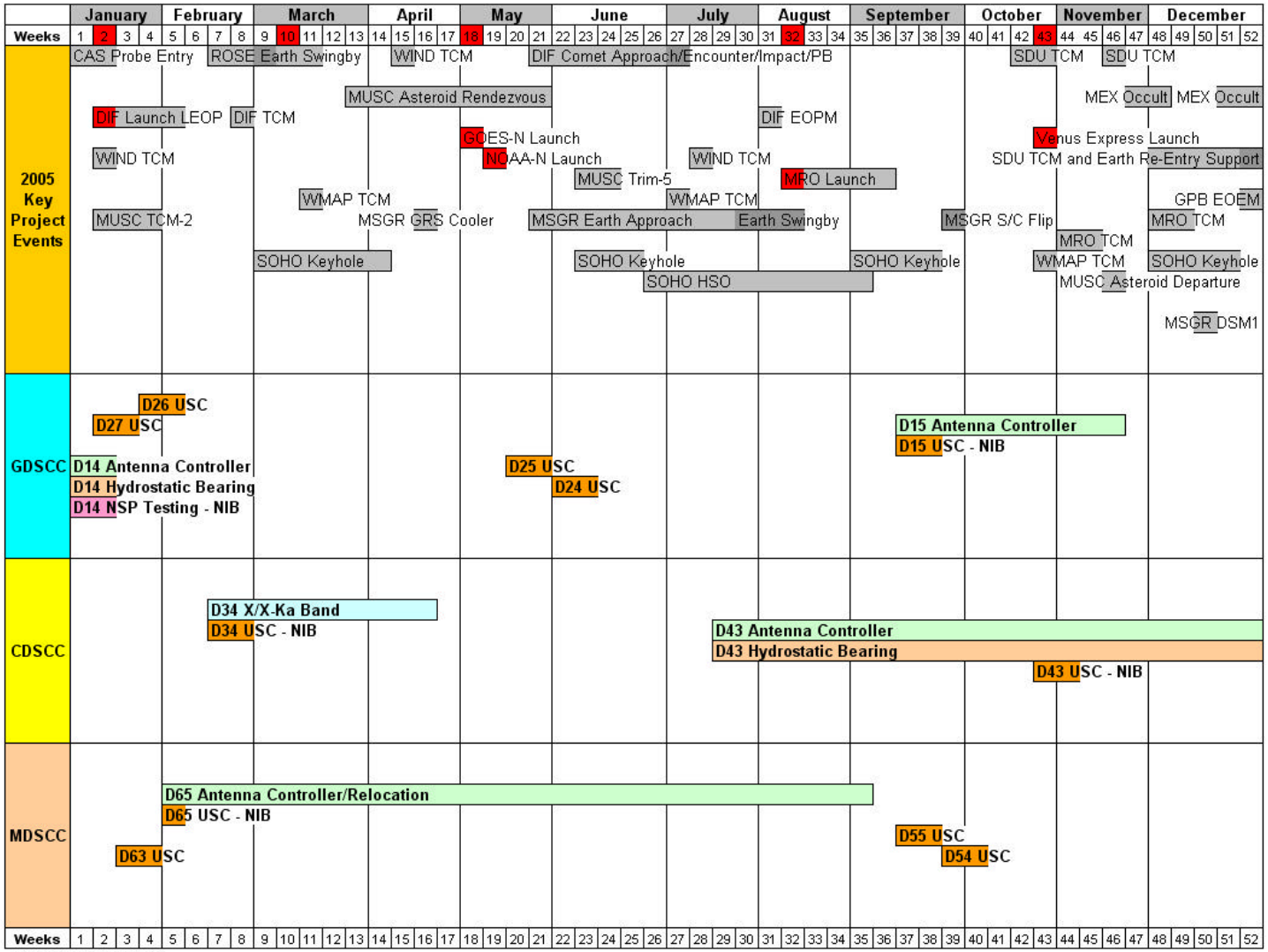

Figure 2 – Proposed Additional Hayabusa (MUSC) Supports

Below are DSN 3-hours passes requested in addition to the current mission requirements. Supports must be scheduled outside of Usuda view periods.
** Tracks can be scheduled anytime between given DOYs, Start Time, and End Time.*

EVENT	DATE	DOY*	Start Time*	End Time*	UDSC SOA	UDSC EOA	PASS LENGTH (HOURS)	ACTIVITY DISCREPTION
Time Line Setup	9/14/05 - 9/15/05	257-258	9:00	19:00	20:30	7:55	3	TKG PASS
Time Line Setup	9/17/05 - 9/18/05	260-261	9:00	19:00	20:30	7:45	3	TKG PASS
Time Line Setup	9/20/05 - 9/21/05	263-264	9:00	19:00	20:30	7:35	3	TKG PASS
Time Line Setup	9/23/05 - 9/24/05	266-267	9:00	19:00	20:30	7:30	3	TKG PASS
Time Line Setup	9/27/05 - 9/28/05	270-271	9:00	19:00	20:30	7:30	3	TKG PASS
Time Line Setup	9/28/05 - 9/29/05	271-272	9:00	19:00	20:30	7:30	3	TKG PASS
Time Line Setup	9/30/05 - 10/1/05	273-274	9:00	19:00	20:30	7:30	3	TKG PASS
Time Line Setup	10/1/05 - 10/2/05	274-275	9:00	19:00	20:30	7:30	3	TKG PASS
Time Line Setup	10/3/05 - 10/4/05	276-277	9:00	19:00	20:30	7:30	3	TKG PASS
Time Line Setup	10/4/05 - 10/5/05	277-278	9:00	19:00	20:35	7:25	3	TKG PASS
Time Line Setup	10/6/05 - 10/7/05	279-280	9:00	19:00	20:35	7:25	3	TKG PASS
Time Line Setup	10/7/05 - 10/8/05	280-281	9:00	19:00	20:35	7:25	3	TKG PASS
Time Line Setup	10/9/05 - 10/10/05	282-283	9:00	19:00	20:35	7:25	3	TKG PASS
Time Line Setup	10/10/05 - 10/11/05	283-284	9:00	19:00	20:35	7:25	3	TKG PASS
Time Line Setup	10/15/05 - 10/16/05	288-289	9:00	19:00	20:45	7:05	3	TKG PASS
Time Line Setup	10/18/05 - 10/19/05	291-292	9:00	19:00	20:45	7:05	3	TKG PASS
Time Line Setup	10/26/05 - 10/27/05	299-300	9:00	19:00	20:45	7:05	3	TKG PASS
Time Line Setup	10/29/05 - 10/30/05	302-303	9:00	19:00	21:05	6:50	3	TKG PASS
Time Line Setup	11/3/05 - 11/4/05	307-308	9:00	19:00	21:05	6:50	3	TKG PASS
Time Line Setup	11/5/05 - 11/6/05	309-310	9:00	19:00	21:05	6:50	3	TKG PASS
Time Line Setup	11/8/05 - 11/9/05	312-313	9:00	19:00	21:05	6:50	3	TKG PASS
Time Line Setup	11/11/05 - 11/12/05	315-316	9:00	19:00	21:05	6:50	3	TKG PASS
Time Line Setup	11/13/05 - 11/14/05	317-318	9:00	19:00	21:25	6:35	3	TKG PASS
Time Line Setup	11/18/05 - 11/19/05	322-323	9:00	19:00	21:25	6:35	3	TKG PASS
Time Line Setup	11/21/05 - 11/22/05	325-326	9:00	19:00	21:25	6:35	3	TKG PASS
Time Line Setup	11/24/05 - 11/25/05	328-329	9:00	19:00	21:25	6:35	3	TKG PASS
Time Line Setup	11/26/05 - 11/27/05	330-331	9:00	19:00	21:45	6:25	3	TKG PASS
Time Line Setup	11/30/05 - 12/1/05	334-335	9:00	19:00	21:45	6:25	3	TKG PASS

Figure 3 – Hayabusa (MUSC) Current User Loading Profile (ULP)

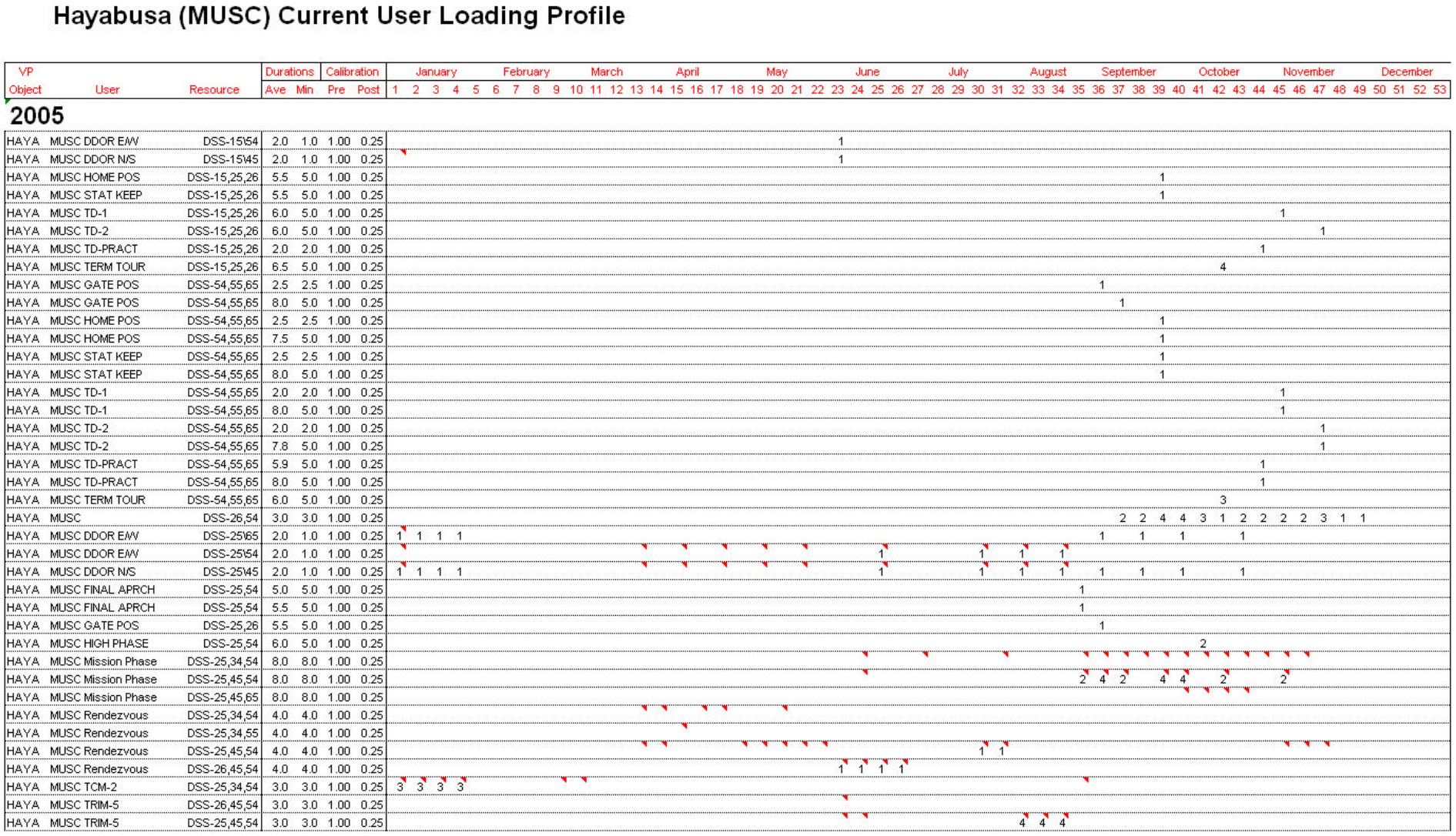

Figure 4– Hayabusa (MUSC) Proposed New User Loading Profile (ULP)

Hayabusa (MUSC) Proposed New User Loading Profile

VP Object	User	Resource	Durations Ave	Min	Calibration Pre	Post	January 1 2 3 4 5	February 6 7 8 9	March 10 11 12 13 14	April 15 16 17 18 19	May 20 21 22 23 24	June 25 26 27 28 29	July 30 31 32 33 34	August 35 36 37 38 39	September 40 41 42 43	October 44 45 46 47 48	November 49 50 51 52 53	December
2005																		
HAYA	MUSC DDOR E/W	DSS-15\54	2.0	1.0	1.00	0.25					1							
HAYA	MUSC DDOR N/S	DSS-15\45	2.0	1.0	1.00	0.25					1							
HAYA	MUSC HOME POS	DSS-15,25,26	5.5	5.0	1.00	0.25								1				
HAYA	MUSC STAT KEEP	DSS-15,25,26	5.5	5.0	1.00	0.25								1				
HAYA	MUSC TD-1	DSS-15,25,26	6.0	5.0	1.00	0.25											1	
HAYA	MUSC TD-2	DSS-15,25,26	6.0	5.0	1.00	0.25												1
HAYA	MUSC TD-PRACT	DSS-15,25,26	2.0	2.0	1.00	0.25											1	
HAYA	MUSC TERM TOUR	DSS-15,25,26	6.5	5.0	1.00	0.25										4		
HAYA	MUSC GATE POS	DSS-54,55,65	2.5	2.5	1.00	0.25									1			
HAYA	MUSC GATE POS	DSS-54,55,65	8.0	5.0	1.00	0.25									1			
HAYA	MUSC HOME POS	DSS-54,55,65	2.5	2.5	1.00	0.25								1				
HAYA	MUSC HOME POS	DSS-54,55,65	7.5	5.0	1.00	0.25								1				
HAYA	MUSC STAT KEEP	DSS-54,55,65	2.5	2.5	1.00	0.25								1				
HAYA	MUSC STAT KEEP	DSS-54,55,65	8.0	5.0	1.00	0.25								1				
HAYA	MUSC TD-1	DSS-54,55,65	2.0	2.0	1.00	0.25											1	
HAYA	MUSC TD-1	DSS-54,55,65	8.0	5.0	1.00	0.25											1	
HAYA	MUSC TD-2	DSS-54,55,65	2.0	2.0	1.00	0.25												1
HAYA	MUSC TD-2	DSS-54,55,65	7.8	5.0	1.00	0.25												1
HAYA	MUSC TD-PRACT	DSS-54,55,65	5.9	5.0	1.00	0.25											1	
HAYA	MUSC TD-PRACT	DSS-54,55,65	8.0	5.0	1.00	0.25											1	
HAYA	MUSC TERM TOUR	DSS-54,55,65	6.0	5.0	1.00	0.25										3		
HAYA	MUSC	DSS-26,54	3.0	3.0	1.00	0.25								4 4 8 8 6	2 4 4 4 4	6 2 1		
HAYA	MUSC DDOR E/W	DSS-25\65	2.0	1.0	1.00	0.25	1 1 1 1							1 1 1	1			
HAYA	MUSC DDOR E/W	DSS-25\54	2.0	1.0	1.00	0.25					1	1 1 1						
HAYA	MUSC DDOR N/S	DSS-25\45	2.0	1.0	1.00	0.25	1 1 1 1				1	1 1 1		1 1 1	1			
HAYA	MUSC FINAL APRCH	DSS-25,54	5.0	5.0	1.00	0.25							1					
HAYA	MUSC FINAL APRCH	DSS-25,54	5.5	5.0	1.00	0.25							1					
HAYA	MUSC GATE POS	DSS-25,26	5.5	5.0	1.00	0.25								1				
HAYA	MUSC HIGH PHASE	DSS-25,54	6.0	5.0	1.00	0.25										2		
HAYA	MUSC Mission Phase	DSS-25,34,54	8.0	8.0	1.00	0.25												
HAYA	MUSC Mission Phase	DSS-25,45,54	8.0	8.0	1.00	0.25							2 4 2	4 4	2	2		
HAYA	MUSC Mission Phase	DSS-25,45,65	8.0	8.0	1.00	0.25												
HAYA	MUSC Rendezvous	DSS-25,34,54	4.0	4.0	1.00	0.25												
HAYA	MUSC Rendezvous	DSS-25,34,55	4.0	4.0	1.00	0.25												
HAYA	MUSC Rendezvous	DSS-25,45,54	4.0	4.0	1.00	0.25						1 1						
HAYA	MUSC Rendezvous	DSS-26,45,54	4.0	4.0	1.00	0.25					1 1 1 1							
HAYA	MUSC TCM-2	DSS-25,34,54	3.0	3.0	1.00	0.25	3 3 3 3											
HAYA	MUSC TRIM-5	DSS-26,45,54	3.0	3.0	1.00	0.25												
HAYA	MUSC TRIM-5	DSS-25,45,54	3.0	3.0	1.00	0.25						4 4 4						